AMENDMENTS TO THE CLAIMS

Claims 1, 16, 18, 20, 24 and 35 have been amended and claims 21 and 30 have been cancelled. A complete list of pending claims follows.

The Listing of Claims will replace all prior versions and listings of claims in the present patent application:

LISTING OF CLAIMS

1. (Currently amended) A method of transmitting signals using a plurality of transmit antennas, the method comprising:

allocating the data to be transmitted among the plurality of transmit antennas, wherein at least one of the plurality of transmit antennas transmits some data that is not transmitted by all of the other of the plurality of transmit antennas;

transmitting a modified preamble from each of the plurality of transmit antennas, wherein the modified preamble <u>has a conventional 802.11a preamble structure and</u> is distinguishable at a receiver from a conventional 802.11a preamble.

2. (Original) The method of claim 1, wherein the plurality of transmitters transmit data in total at an extended rate above a corresponding 802.11a data rate.

3. (Original) The method of claim 1, wherein the modified preamble comprises a modified long training pattern distinct from a conventional 802.11a long training pattern.

4. (Original) The method of claim 3, wherein at least a part of the modified long training pattern has a low cross correlation with a corresponding part of the conventional 802.11a pattern, thereby facilitating discrimination based on cross correlation.

5. (Original) The method of claim 4, wherein the at least a part of the modified long

training pattern is transmitted using more than one of the plurality of transmit antennas such that it is receivable and processable by one or more receivers.

6. (Original) A method of discriminating between a packet sent with a conventional 802.11a rate or with an extended rate, comprising:

receiving one or more signals from one or more transmitters, the one or more signals including a long training subcarrier;

multiplying the long training subcarrier with a conventional 802.11a long training pattern to form a first product;

multiplying the long training subcarrier with an extended 802.11a long training pattern to form a second product;

determining, from the first product and the second product, which long training pattern was more likely to have been sent for the received long training subcarrier; and

discriminating as to which type of packet was sent based on the more likely sent long training subcarrier.

7. (Original) A method of transmitting signals using a plurality of transmit channels, the method comprising:

allocating the data to be transmitted among the plurality of transmit channels, wherein at least one of the plurality of transmit channels transports some data that is not transmitted over all of the other of the plurality of transmit channels;

transmitting a modified preamble from each of the plurality of transmit channels, wherein the modified preamble is distinguishable at a receiver from a conventional 802.11a preamble and includes an out-of-band component.

8. (Original) The method of claim 7, wherein the plurality of transmit channels

comprise a plurality of frequency channels.

9. (Original) The method of claim 8, wherein the plurality of frequency channels are adjacent 20 MHz channels.

10. (Original) A method of transmitting signals using a plurality of transmit channels, the method comprising:

allocating the data to be transmitted among the plurality of transmit channels, wherein at least one of the plurality of transmit channels transports some data that is not transmitted over all of the other of the plurality of transmit channels;

for at least one set of at least two adjacent transmit channels, transmitting data over the set wherein at least some data is encoded in out-of-band subcarriers at frequencies between frequencies allocated to the at least two adjacent transmit channels.

11. (Original) In a communications system having a channel divided into a plurality of adjacent frequency bands separated by out-of-band frequency ranges, wherein data is transmitted within the bands of the plurality of frequency bands, a method of increasing data capacity of the channel comprising:

for data to be transmitted from a transmitter, allocating a first portion of the data among the plurality of transmit frequency bands and allocating a second portion of the data to at least one out-of-band frequency range when the first portion is allocated to adjacent bands, wherein the at least one out-of-band frequency range includes an out-of-band frequency range between the adjacent bands;

transmitting the first portion within the plurality of transmit frequency bands; and

transmitting the second portion within the at least one out-of-band frequency range.

12. (Original) The method of claim 11, further comprising:

prior to transmitting at least the second portion of the data, transmitting one or more training symbols usable for a receiver to estimate transmission characteristics of the out-of-band frequency ranges; and

using received signal of the one or more training symbols to modify processing of a received signal corresponding to the second portion of the data to account for the transmission characteristics of the out-of-band frequency ranges.

13. (Original) A method of discriminating between a packet sent as a conventional 802.1la packet and a packet sent using an extended mode not normally supported under the conventional 802.11a standard, the method comprising:

receiving a signal from a wireless medium, wherein the signal was transmitted from an extended mode transmitter as a packet wherein packet data is preceded by a packet preamble and wherein the packet preamble is generated from a cyclically shifted 802.11a preamble;

demodulating the signal to obtain a demodulated signal;

decoding, from the demodulated signal, a packet data sequence including a cyclically shifted 802.11a preamble when receiving packet data from an extended mode transmitter and a conventional 802.11a preamble when receiving packet data from a conventional 802.11 a transmitter; and

discriminating as to which type of packet was sent based on the received packet data sequence.

14. (Original) The method of claim 13, wherein the extended mode includes at least a MIMO extended mode wherein the packet preamble is generated from the cyclically shifted 802.11a preamble.

15. (Original) The method of claim 14, further comprising performing MIMO channel estimation using the received preamble data.

16. (Currently amended) The method of claim 13, ~~wherein the~~ further comprising performing MIMO channel estimation using the received preamble data.

17. (Original) The method of claim 13, wherein the signal transmitted from an extended mode transmitter is such that legacy devices can decode a signal field of the preamble.

18. (Currently amended) The method of claim 13, further comprising detecting that the signal transmitted used from an extended mode transmitter using a MIMO mode, the detecting using at least one out-of-band subcarrier.

19. (Original) The method of claim 13, further comprising detecting that the signal transmitted used from an extended mode transmitter using a MIMO mode, the detecting including detecting a presence of cyclically shifted preamble components.

20. (Currently amended) A method of transmitting a packet, using a MIMO transmitter having a plurality of antennas, over a wireless network ~~wherein receivers operating as conventional 802.11a receivers might be present~~, the method comprising:

obtaining data fields of a packet to be transmitted;

generating preamble fields of the packet to be transmitted, including an extended mode preamble distinguishable at a receiver from a conventional 802.11a preamble, wherein a conventional 802.11a receiver can decode one or more fields of the extended mode preamble; and

transmitting the packet including the extended mode preamble.

21. (Cancelled)

22. (Original) The method of claim 20, wherein the fields of the extended code preamble include a modified long training sequence.

23. (Original) The method of claim 20, wherein the fields of the extended mode preamble include a modified signal field.

24. (Currently amended) A method of communicating a packet, using a MIMO transmitter having a plurality of antennas, over a wireless medium to a MIMO receiver ~~wherein receivers operating as conventional 802.11a receivers might be listening to transmissions in the wireless medium~~, the method comprising:

obtaining data fields of a packet to be transmitted;

generating preamble fields of the packet to be transmitted, including an extended mode preamble;

transmitting the packet, including the extended mode preamble, as a signal into the wireless medium;

receiving a representation of the signal from a wireless medium;

at a receiver, demodulating the signal to obtain a demodulated signal;

at the receiver, decoding, from the demodulated signal, a packet data sequence including data representing at least a portion of a preamble;

where the receiver is a MIMO receiver, processing the packet data sequence according to an extended mode operation; and

where the receiver is a conventional 802.11a receiver, processing the packet data sequence to determine at least one valid conventional 802.11a preamble field and deferring further data reception related to that packet data sequence after determining, from the preamble,

that the packet data sequence represents a packet not in conformance with a conventional 802.11a packet.

25. (Original) The method of claim 24, wherein the fields of the extended mode preamble include a modified short training sequence.

26. (Original) The method of claim 24, wherein the fields of the extended mode preamble include a modified long training sequence.

27. (Original) The method of claim 24, wherein the fields of the extended mode preamble include a modified signal field.

28. (Previously presented) A method of transmitting signals using a plurality of transmit channels, the method comprising:

allocating the data to be transmitted among the plurality of transmit channels, wherein at least one of the plurality of transmit channels transports some data that is not transmitted over all of the other of the plurality of transmit channels;

transmitting a modified preamble from each of the plurality of transmit channels, wherein the modified preamble is usable for performing channel estimation and at least a first part of the modified preamble for at least a first of the plurality of transmit channels is a cyclically shifted version of a second part of the modified preamble for at least a second of the plurality of transmit channels.

29. (Previously presented) The method of claim 28, wherein the first part and the second part comprise signal sequences with a low cross-correlation between long training symbols.

30. (Cancelled)

31. (Previously presented) The method of claim 28, further comprising MIMO synchronization.

32. (Previously presented) The method of claim 28, wherein the data to be transmitted is allocated to a plurality of subcarriers, the subcarriers of the plurality of subcarriers are allocated among transmit channels, and each transmit channel is associated with a distinct antenna.

33. (Previously presented) The method of claim 28, wherein the data to be transmitted is allocated to a plurality of subcarriers and some of the subcarriers of the plurality of subcarriers are inverted relative to other subcarriers of the plurality of subcarriers.

34. (Previously presented) The method of claim 28, wherein the data to be transmitted is allocated to a plurality of subcarriers inlcuding at least one out-of-band subcarrier.

35. (Currently amended) The method of claim 28, further comprising estimating channel response by:

receiving signals and sampling for a long training symbol; computing a 64-point FFT of the received long training symbol;

multiplying each subcarrier ~~is multiplied~~ by known pilot values;

computing an IFFT of the result of the multiplication, resulting in a 64-point impulse response estimate;

isolating each of a plurality of impulse responses, one per MIMO transmitter; and

deriving channel estimates for all subcarriers from the isolated impulse responses by taking a 64-point FFT of each of the plurality of impulse responses, where the sample values are appended by zero values to get 64 input values as needed.